

SOIL SURVEY OF SPALDING COUNTY, GEORGIA.

By J. E. LAPHAM, W. S. LYMAN, and CHARLES W. ELY.

LOCATION AND BOUNDARIES OF AREA.

Spalding County is situated in the west-central part of Georgia. The latitude and longitude at the Georgia experiment station, which is located near the center of the county, was determined for

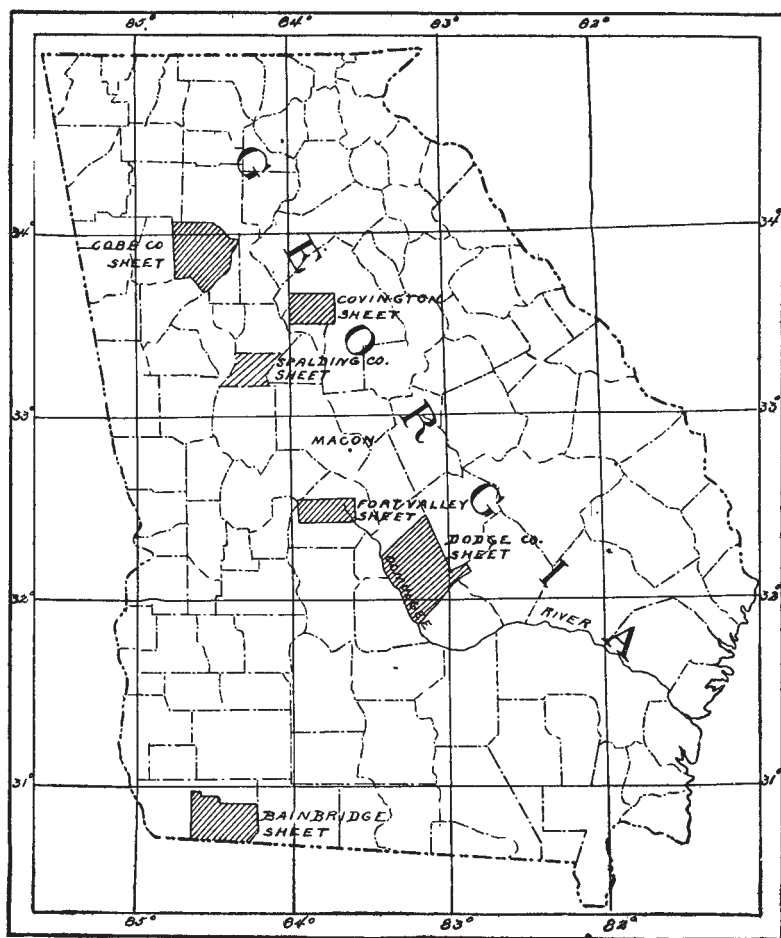


FIG. 13.—Sketch map showing location of the Spalding County area, Georgia.

astronomical purposes in 1900 and found to be longitude $84^{\circ} 24' 58''$ west, latitude $33^{\circ} 13' 55''$ north. Griffin, the county seat, is 43 miles south of Atlanta, and 250 and 69 miles, respectively, northwest of Savannah and Macon.

Spalding County is bounded on the north by Henry and Clayton counties, on the east by Henry and Butts, on the southeast by Monroe, on the south by Pike, and on the west by Meriwether, Coweta, and Fayette counties. The county contains 130,944 acres or about 205 square miles.

HISTORY OF SETTLEMENT AND AGRICULTURAL DEVELOPMENT.

Some difficulty was found in securing facts regarding the early history of Spalding County, and specific data as to the date of the first settlement are wanting. The first settlers began to arrive, however, somewhere about 1815 to 1825, some of them coming from Virginia and other nearby States, but most of them from other counties of Georgia. Spalding was for a long time, and until its separate organization in 1851, a part of Pike County, the seat of government of which was Zebulon.

The early agricultural products of the area were corn and wheat, the acreage of the former being by far the larger. At the time of the outbreak of the civil war about one-half of the county was yet wooded, and there were few towns and railroads. It was necessary for the farmers to produce a great part of the breadstuffs, meats, etc., needed for subsistence. The production of corn was nearly 25 per cent greater in 1860 than in any year since. The number of live stock was also greater, especially sheep and hogs. The stock required little attention, getting almost if not all their food from the pastures and mast found in the woods and from the cane growing along the streams. Cotton was not an important crop until about the year 1860.

The history of the agricultural development of this section of the State is one of steady progress until the outbreak of the civil war. The farmers were prosperous and able to produce, and to a great extent did produce, everything needed on their own farms.

Between 1870 and 1880 the farmers became more accustomed to the changed conditions and the production of cotton doubled, although there was only a comparatively small increase in the production of corn. At the end of this decade cotton had become the staple crop and the progress since then has been simply a development of this industry.

By 1890 nearly all the land suited to agriculture had been brought under cultivation and any increase in farm products since then has been the result of a dividing up of farms and of improved methods.

CLIMATE.

The following table, compiled from Weather Bureau records, gives the monthly and annual mean temperature and precipitation for Experiment:

Normal monthly and annual temperature and precipitation.

Month.	Experiment.		Month.	Experiment.	
	Temper- ature.	Precipi- tation.		Temper- ature.	Precipi- tation.
	° F.	Inches.		° F.	Inches.
January.....	44.0	3.89	August.....	78.2	6.14
February.....	47.3	5.00	September.....	73.7	1.93
March.....	53.8	4.91	October.....	62.8	2.93
April.....	62.8	3.50	November.....	53.2	2.67
May.....	71.8	2.82	December.....	45.9	3.23
June.....	78.6	4.53	Year.....	62.6	47.65
July.....	79.4	6.10			

Complete records of the killing frosts are not obtainable, but from records covering 1898, 1900, 1901, 1902, 1903, and 1904, the averages seem to be about March 10 and November 9 for the last and first killing frost in spring and fall, respectively. This gives a growing season, free from frosts, of 244 days. In the present year (1905) a frost severe enough to kill many young peaches occurred April 17.

PHYSIOGRAPHY AND GEOLOGY.

Spalding County, being situated in central Georgia, is in the physiographic province known as the Piedmont Plateau. This plateau extends across the State in a northeasterly-southwesterly direction, with Augusta, Milledgeville, and Columbus approximately on the boundary line between it and the Coastal Plain. The general elevation of Spalding County is about 1,000 feet. The country is rolling to hilly, and is drained by numerous small streams tributary to Flint and Towaliga rivers, which form, respectively, the partial western and eastern boundaries of the county. The general drainage of the county is to the south. The streams have eroded quite deep valleys into the plain, with a difference in elevation between the stream bottoms and hilltops of from 20 to 200 feet. Though the soil washing is in many cases rather severe, the slope of the hills is not usually very steep, infrequently exceeding 10°. Along many of the larger streams alluvial flats have been built up. These attain a width of more than one-fourth of a mile in some localities along Flint River and Line Creek, but on the smaller creeks of the county they are seldom more than a few rods wide.

The underlying rock formation of Spalding County consists of granite, gneiss, schist, and other metamorphic and eruptive crystalline rocks. A good quality of granite is quarried to some extent a short distance north of Griffin, where, in the valley of Cabin Creek, a few irregular patches are exposed and wider areas are but thinly covered with soil. With the exception of a very few of these outcrops, however, the underlying rock of the county is covered with soil

ranging from 2 or 3 to 20 or more feet in thickness. The depth varies considerably, owing to the fact that some of the rocks disintegrate and form soil more rapidly than others, and also because of the difference in the rapidity of erosion and transportation.

The soils of the area are residual in origin, being formed directly from the rocks which they overlie. The continuous and ever active physical and chemical forces operate in disintegrating the rock into finer and finer particles, forming them, after weathering and the incorporation of organic matter, into a complete soil, capable of the support of vegetable life. The arrangement of the mineral particles, as into sands, loams, clays, and the heavier subsoil underlying the looser, more porous top soil, is effected by gravitation and the assorting power of water, facilitating the removal of the finer and more completely weathered particles, and leaving at the surface the coarser and more resistant grains of quartz, feldspar, etc.

The heavy red Cecil clay, which often exhibits particles of mica, is more readily formed from the fine-grained micaceous schist, while the Cecil sandy loam and Cecil sand is more uniformly found in areas where the coarser grained granites and gneisses predominate.

Probably not over 10 per cent of Spalding County is in forest, the tree growth consisting of shortleaf and loblolly pine, together with such hardwoods as white, water, willow, post, and black-jack oaks, and beech, dogwood, hickory, etc. Along the bottoms tulip and sycamore are present with an undergrowth of alder. Originally there were quite extensive groves of chestnut on the upland, but this species has almost wholly disappeared. Longleaf pine is occasionally, though rarely, seen.

SOILS.

The soils of Spalding County were separated into four different types. Cecil clay and Cecil sandy loam constitute the main body of the upland, the Cecil sand occupying but a few small areas. The other type—Meadow—is what is usually known as bottom land, and occurs only along the streams.

Areas of different soils.

Soils.	Acres.	Per cent.
Cecil clay.....	66,560	50.9
Cecil sandy loam.....	54,464	41.8
Meadow.....	9,472	7.0
Cecil sand.....	448	.3
Total.....	130,944

CECIL CLAY.

The depth of the soil of the Cecil clay varies to some extent, but on an average it is about 6 inches. The material consists usually of a heavy red loam or clay loam, but sometimes has the consistency of a sandy loam at the immediate surface. The soil, however, is so shallow and the gradation into the heavy clay subsoil so abrupt that a considerable amount of the latter is turned up in cultivation, giving to the whole mass the physical character and agricultural value of a clay soil. The subsoil is a heavy compact red clay of fine, close structure, possessing good retentive power for moisture. It rests directly upon the crystalline rocks from which it is derived, and the depth ranges from 2 to 20 feet. Usually the distance to the partially weathered rock is 4 feet or more. In some localities from 5 to 20 per cent of stone is distributed in the soil and subsoil, but the quantity is seldom sufficient to interfere with cultivation.

The Cecil clay has been mapped in all parts of the area surveyed, but is confined for the most part to the central, northern, and north-eastern parts of the county. The topography is rolling to hilly in character, the type in many instances occupying all the contours of a hill, though usually occurring on the side slopes that have been to a greater or less extent denuded of the coarser materials by rains. Though these slopes are often sufficiently steep to cause destructive washing, this tendency is corrected to a great extent by terracing. There is but a comparatively small proportion of this type of soil which has not sufficient surface slope to secure good drainage without resorting to artificial means, though underdrainage in some instances would serve to improve the condition of the flatter hilltops.

The soil is residual in origin and is formed by the weathering of the underlying crystalline rocks, consisting of granite, gneiss, and mica schist. In the case of the coarser grained, more siliceous granite and gneiss a longer time is required for the formation of the residual clay and its separation from the various grades of sand which the parent rock yields, but in the end there is little or no difference in the physical characteristics of the clay derived from the various rocks.

The Cecil clay is the strongest soil in the area for general farm purposes, and is well adapted to the production of grass, corn, wheat, and other cereals. Little grass is grown in the area at the present time, either for hay or for pasturage, yet it is believed that both clover and alfalfa would do well if a little patience were exercised to secure a catch. Cotton does well upon this type in favorable seasons, but it is not considered so safe a soil under varying conditions as the Cecil sandy loam. A number of fine peach orchards were seen on this type, and the adaptability of the soil for this class of fruits is evidenced by the superior quality and good yields secured. Apples also do well on this heavy type of land.

The principal crops grown are corn and cotton, the former yielding an average of about 15 bushels, and the latter from one-half to three-quarters bale to the acre, while under the most favorable conditions 1 bale to 1½ bales have frequently been grown.

The following table gives the average results of mechanical analyses of the soil and subsoil of the Cecil clay:

Mechanical analyses of Cecil clay.

[Fine earth.]

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
12850, 12848	Soil	1.9	6.1	5.2	28.8	8.4	12.7	36.7
12849, 12851	Subsoil4	1.6	1.9	15.2	6.6	15.3	58.9

CECIL SANDY LOAM.

The Cecil sandy loam, to a depth ranging from 6 to 15 inches, consists of a rather coarse sandy loam. It is gray at the surface and somewhat incoherent, but becomes yellowish and more plastic below 4 or 6 inches. The subsoil is usually a heavy red clay, sometimes containing a small amount of sand in the upper part of the section. Local spots are present in some of the smaller stream valleys where the subsoil is of a yellowish color down to a depth of about 2 feet, at which depth the red clay is encountered. The texture of the yellow clay is only slightly more sandy than the red clay, and the areas are usually not more than 2 or 3 acres in extent, and do not differ appreciably, in agricultural value, from the main type.

Cecil sandy loam covers 41.8 per cent of the entire county. The largest and most connected bodies of it occur in the southwestern part of the area, though there is an irregular distribution of it in other parts as well. The type occupies a rolling topography similar to that of the Cecil clay. The contours of the hills are well rounded, and the erosion of the streams has given them a relative elevation of from 20 to 200 feet. Though the soil is usually uniformly distributed, its greatest thickness is found in the flatter parts of the valleys, where a more abundant accumulation of sand results from the wash of the upper hill slopes.

The drainage is well established, and little or no ditching is required; in fact, free use of the terrace system of cultivation has been adopted to prevent the rain waters from running off too rapidly and causing denudation of the soil and destruction of the fields.

The Cecil sandy loam, like the Cecil clay, is a residual soil and is the result of the disintegration and weathering, less complete, of the underlying granite and gneiss. The individual sand grains present are mainly composed of quartz, though a considerable amount of feld-

spar is also to be seen in some localities where the surface of the fields appears whitest.

Under the varying conditions of temperature and rainfall the Cecil sandy loam is considered the safest soil of the area for cotton, though the capabilities of yield under the most favorable circumstances are not quite as great upon the sandy loam as they are upon the Cecil clay. Corn does fairly well upon this type, though not as well as upon the heavier clay. It is well adapted to watermelons, and upon the lighter, sandier phases of the type good yields and an excellent quality are produced.

The principal crops grown are corn and cotton, the latter having somewhat the larger acreage. Corn yields on an average about 12 bushels, while cotton produces about one-half bale under the average conditions of cultivation and fertilization. The greater proportion of the peach crop of the area is grown upon Cecil sandy loam, and the extension of the industry, which has already proved so profitable, might safely be undertaken. The variety grown to the exclusion of nearly all others is the Elberta, which is a native of Georgia and a great favorite, not only in the South, but with northern shippers and consumers.

The following table gives the average results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Cecil sandy loam.

[Fine earth.]

Number.	Description	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
12840, 12844	Soil	4.8	18.2	10.7	26.7	8.5	16.8	13.8
12841, 12845	Subsoil.....	2.8	10.9	7.0	14.8	4.5	14.4	45.2

CECIL SAND.

The soil of the Cecil sand, which ranges from 8 to 24 inches in depth, consists of a rather coarse sand, light-gray, loose and incoherent at the surface, but becoming loamy and yellowish below 8 inches. The subsoil is a yellowish or slightly reddish sandy clay, which is more sandy in the upper section. The soil, while not very retentive of moisture, is loose and easily cultivated and does not wash to such an extent as the heavier soils, much of the excess rain water percolating downward into the soil instead of running off the surface.

The type occupies less than 1 per cent of the area and occurs in small isolated spots in the southwestern part of the county, the largest of these spots being less than a square mile in extent. It is generally found on the lower slopes of the hills and the natural drainage is adequate for nearly all purposes.

The Cecil sand has been derived from the coarser-grained varieties of the underlying crystalline rock, in the same manner as have the other upland soils of the area.

The type is very well adapted to the production of sweet potatoes, peanuts, watermelons, and crops requiring an early, warm soil, capable of very free drainage. It is also a suitable type for the earliest garden vegetables and for strawberries and other small fruits. The principal use of the type at the present time is for cotton, though some corn is also grown. The yields, however, are low and the profits small as compared with those from the heavier and more loamy soils.

The following table gives the results of mechanical analyses of the soil and subsoil of the Cecil sand:

Mechanical analyses of Cecil sand.

Number.	Description	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clav.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
12846.....	Soil	8.6	26.2	16.3	27.4	5.0	10.0	6.2
12847.....	Subsoil.....	5.2	19.6	12.3	27.1	4.7	12.3	18.5

MEADOW.

The Meadow mapped in Spalding County consists of a heterogeneous mixture of soil materials, ranging from a fine clay and silt to a medium or coarse sand. This variation in texture and general characteristics is true not only of the section as obtained by boring and as seen in bank exposures, but of the surface of the soil as well. In some places the top soil is a heavy red clay not unlike that of the Cecil clay, underlain at a depth of a few inches by a dark-bluish mixture of sand, clay, and gravel, while perhaps a short distance away on the same stream bottom the surface of the Meadow will be a nearly pure sand, underlain in turn by layers of clay, gravel, and sand, more or less stratified.

The Meadow occurs as a narrow strip along the margins of some of the larger streams, and is derived from the sediments deposited by these streams in times of high water. The areas are nearly always poorly drained, but with ditching can be made very productive and valuable for the growth of corn, grass, and many of the vegetables. Many of these bottoms are at present covered with a growth of alder, willow, sycamore, and other trees and shrubs, while other areas which have been cleared make good pasturage for cattle.

AGRICULTURAL CONDITIONS.

The general appearance of the farms of Spalding County indicates a greater degree of prosperity than is found in many sections of the South. Many of the farmhouses are commodious and neatly painted, and large dwellings are not uncommon.

Something over 60 per cent of the land in Spalding County is under cultivation, and there is only a relatively small area that can not be used for some agricultural industry. The price of land varies from \$5 to \$100 an acre, the latter in a favorable location near Griffin, but the average value for the entire county is between \$7 and \$8 an acre. The farm lands are mainly rolling, but terracing and contour cultivation have become so common in recent years that comparatively little land has been rendered useless by washing. At the present level of land prices and rental values, farming lands are expected to yield a return of about 10 per cent on the money invested.

Tenants in Spalding County—and the proportion of tenants in the farming population is high—are more prosperous than the landowners. Where cotton is relied upon as the sole money crop, as it is in this county, the farmer often finds it difficult when prices are low to pay rent and buy necessary supplies. The better class of farmers produce most of the breadstuffs and meats needed for home use, as well as feed for the work stock, but the majority do not.

According to the Twelfth Census only 31 out of every hundred farms in the county are operated by the owners themselves. The rest are rented either for cash or a share of the crops produced. Cash rents range from \$3 an acre upward. Tenants on shares may have only the land furnished them, in which case they receive two-thirds of the cotton, or the landlord may furnish teams, implements, etc., in which case each gets one-half the crop. About five-eighths of the tenants are negroes, and the share system is somewhat more common among them than among the whites. Only a few negroes own land. According to the Twelfth Census, the average-sized farm contains 93.6 acres, of which 56 acres are improved or cultivated land. The farms most numerous are those of 20 to 50 acres, but somewhat over one-half of the total land in the county is in farms of from 50 to 175 acres. There are a few farms of 500 acres or over, and a great many men own that much land or more. The large tracts are rented out in smaller areas, 25 to 30 acres, or about what can be cultivated with one horse.

Labor, which in this section is very largely colored, is regarded as reasonably efficient, especially in the growing of cotton. The hands receive from \$9 to \$15 a month and board. Cotton is picked by the hundredweight, the rate varying from 40 to 65 cents. Wealthy landowners who rent a considerable proportion of their land usually exercise almost as much supervision over their tenants as they do over hired labor. The supply of hands varies somewhat as the price of cotton. If cotton is high, a great many prefer to rent land. If it is low, they prefer to work as field hands. Sometimes it is hard to get enough field hands during the rush seasons to do the work as

speedily as is necessary. The expenditure for labor for the entire county in 1899 was \$65,200, or about \$57 to the farm.

As already stated, cotton is the chief crop grown in Spalding County. Nearly one-half of the entire area of the land cultivated in any one year is planted to this crop. The average yield varies from one-fourth to three-fourths bale an acre. Fertilizers are generally used in the production of this crop, the most common material being cotton-seed meal and acid phosphate. Corn is the next most important crop, about 40 per cent of the cultivated land being devoted to this grain. The ears are gathered with the husks on, and only a few farmers utilize the fodder. Corn shredders are being introduced in the county, generally with satisfactory results. The average yield of corn varies from 8 to 12 bushels per acre. Wheat and oats are the next important crops, occupying, respectively, 5 and 4 per cent of the cultivated land. The average yield of wheat is 8 bushels per acre and of oats 12 bushels. As a rule these crops occupy only small areas, and, as a whole, are comparatively unimportant. The wheat grown here is of good quality, however, and it would seem that it should prove profitable to grow it more extensively. The Cecil clay is a good soil for wheat growing, and an average yield of 20 to 25 bushels would not be an unreasonable expectation if the soil were brought into the proper condition.

Not very much attention is paid to the production of hay. In fact, hay is shipped into this area and purchased by the farmers to feed to their stock. No clover or alfalfa is produced and only a limited quantity of cowpeas. Very few pastures are seen. It is very probable that the hay crop might be made profitable. The soils, especially the Cecil clay, should produce a good quality and yield, and if what were needed were produced at home it would keep a considerable amount of money in the county that is now expended for western hay. Cowpeas and similar plants would make good hay, and the stubble, if turned under, would increase the productiveness of the land by improving its physical condition and by adding organic matter and nitrogen—the element most needed by soils used almost continuously for cotton production. The rotation considered most suited to conditions by the best farmers is cotton one year, followed by corn or small grain, which is followed by cowpeas or some other hay crop. This is said to increase gradually the organic matter in the soil and to make it darker and more productive. As the color of most of the Cecil sandy loam and Cecil clay indicates, such a treatment of the soils is not general. Its introduction would probably greatly increase the money returns secured from these soils. The general custom is to grow cotton for one or two years, which is followed by corn, and this again by cotton. Occasionally cowpeas may be sown in the corn, but this is rare.

In addition to the crops already mentioned, relatively small areas are planted to Irish and sweet potatoes, and a few small areas to sugar cane and sorghum, to be manufactured into sirup, all for domestic use. The total value of orchard products in 1900 was \$70,728, principally strawberries and peaches. Since then a great many peach orchards have been set out, and in time fruit growing will probably be an important industry. Peaches are grown on both the Cecil sandy loam and the Cecil clay, but the more hilly portions of the Cecil clay are probably better adapted to fruit growing on account of better atmospheric drainage and consequent less danger from frosts.

The same crops are generally grown on the two main soil types, and it can not be said that any great attention has been paid to the adaptation of soils to particular crops. The Cecil clay is said to produce heavier yields in favorable seasons, but the Cecil sandy loam is looked upon as a more reliable soil for a term of years, as crops on the heavier soil sometimes suffer during wet seasons. The more sandy soils are recognized as well adapted to watermelons, and in the past have been used for that purpose to some extent, but at the present time, except for home use, few are grown.

The area surveyed is well supplied with railroads. Both the Southern and the Central of Georgia systems cross the county in north and northwestern directions through Griffin. A branch of the Central reaches Griffin from the western part of the county, and a branch of the Southern also traverses that part of the county. Few farms are more than 8 or 9 miles from a railroad station.

The county also has a well-developed road system. Roads leave Griffin in all directions, and are intersected by frequent crossroads. There are few points in the county more than a mile from a county road. The roads are worked by convict labor, and are kept in fairly good condition most of the year. At present, however, efforts in road improvement are confined to grading and leveling. There is a great abundance of granite and other rock suitable, if crushed, for road material, and if this were utilized it would be possible to have a much better system than at present.

The county is only about 205 square miles in extent, and Griffin is the only town of any consequence. It is quite easily reached from all parts, and practically all of the farm products are marketed there. There are five cotton mills, and these handle all the cotton and cotton seed produced within the county, as well as some from adjoining counties. Points so far away as to be unable to haul cotton to Griffin ship it from the small stations found every few miles along the several railroads traversing the county.

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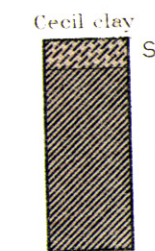
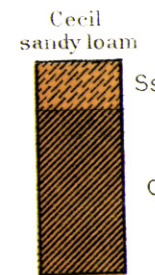
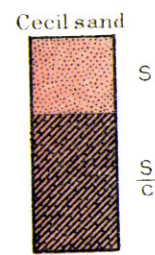
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SOIL MAP
GEORGIA
SPALDING COUNTY SHEET

U.S. DEPT. OF AGRICULTURE
BUREAU OF SOILS
MILTON WHITNEY, CHIEF

GEORGIA AGRICULTURAL EXPERIMENT STATION
R. J. REDDING, DIRECTOR

SOIL
PROFILE
(3 feet deep)



LEGEND

S Sand
Ss Sandy loam
Ssc Sandy loam
C Clay
Cc Clay loam

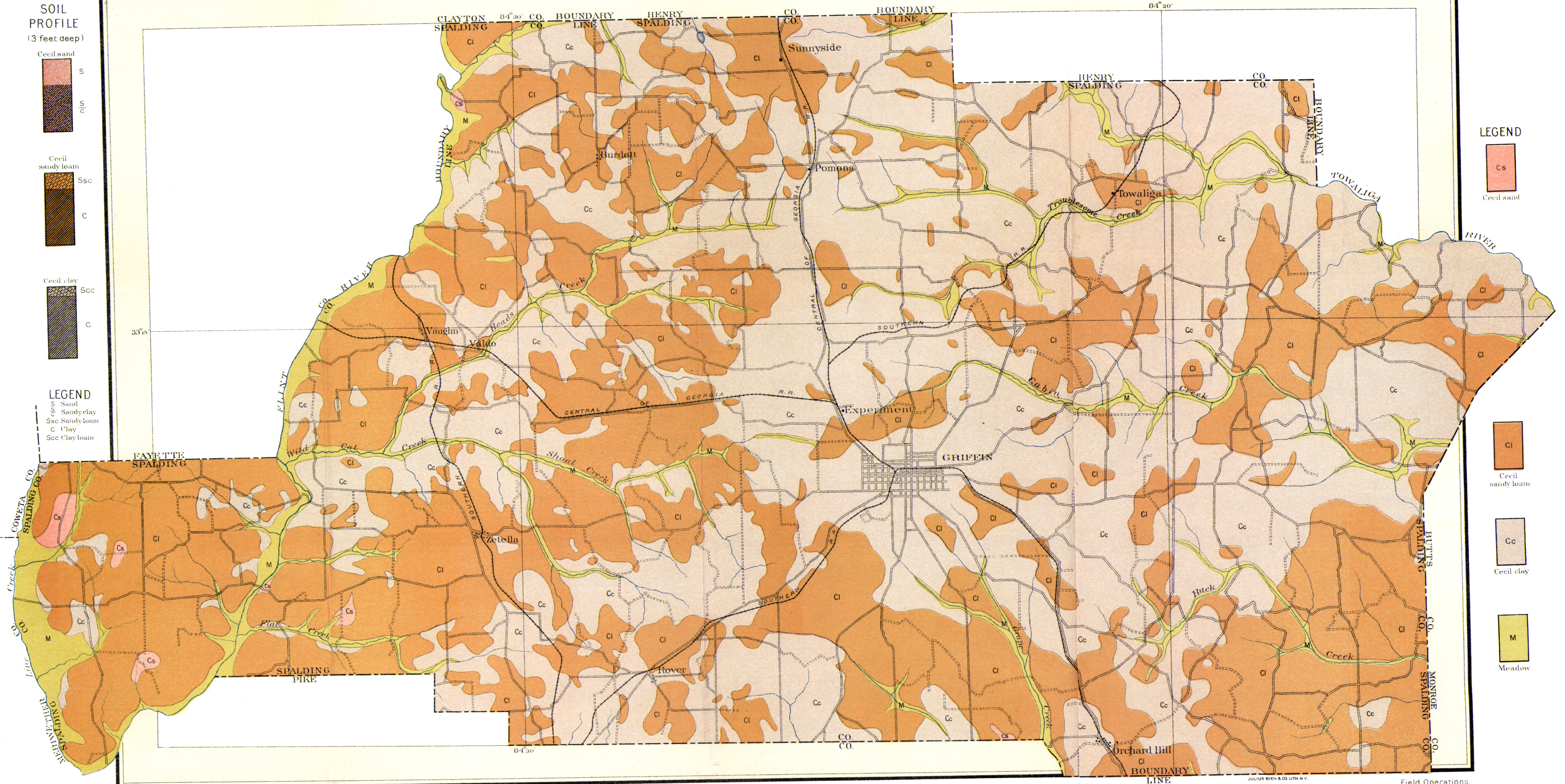
LEGEND

Cs
Cecil sand

Cl
Cecil sandy loam

Cc
Cecil clay

M
Meadow



Soils surveyed by
J. E. Lapham, W. S. Lyman,
and Charles W. Ely.
1905.

Scale 1 inch = 1 mile

Field Operations
Bureau of Soils
1905.